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ABSTRACT

The key to high school student motivation is recognizing and rewarding academic effort. Compared to the United States, students in foreign countries study harder and their parents demand more of the schools because labor market success is determined by how much is learned in high school. Schools in the United States, however, reward students for time spent in school, but offer few benefits for students who study hard. This failure to reward academic achievement is the result of the following phenomena: (1) the labor market fails to reward effort and achievement; (2) college admission is based on relative measures, such as Scholastic Aptitude Test (SAT) scores and class rank and grade point average (GPA); (3) classmates actively discourage academic effort that would result in an upward shift of the grading curve; and (4) parents do not demand higher standards that would place students at risk of not graduating, but would not improve SAT scores or GPAs. The following reforms are suggested: (1) institute statewide achievement tests; (2) establish new graduation credentials; (3) expand the Advanced Placement Program; (4) replace the SAT; (5) modernize the cognitive content of the General Aptitude Test Battery (GATB); (6) encourage employers to use high school grades and a spectrum of achievement tests for hiring; (7) require all applicants for civil service positions to submit school and college transcripts; (8) base admission to the armed forces on competence in science and technical subjects; (9) extend school operations; (10) require students who are experiencing academic difficulty to attend remedial programs; and (11) institute cooperative learning strategies. Statistical data are presented in one table and seven graphs. A 63-item bibliography is appended. (FMW)

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INCENTIVES FOR LEARNING: WHY AMERICAN HIGH SCHOOL STUDENTS COMPARE SO POORLY TO THEIR COUNTERPARTS OVERSEAS

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CENTER FOR ADVANCED HUMAN RESOURCE STUDIES

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EXECUTIVE SUMMARY: **INCENTIVES FOR LEARNING**

by John Bishop, Cornell Univ.

Research Findings: In math and science the gap between Japanese, Canadian, English and Finnish high school graduates and white American high school graduates is more than twice the size of the 2 to 3 grade level equivalent gap between blacks and whites in the US.

American high school students do poorly in these comparisons primarily because they devote a lot less time and energy to the task of learning. Parents are apathetic as well. Even though American children learn substantially less in school, American parents are more satisfied with the performance of their local schools than parents in Japan and Taiwan.

In Canada, Australia, Japan and Europe, students study harder and parents demand more of their schools because labor market success is determined by how much is learned in high school. National or provincial examinations assessing grasp of the high school curriculum determine admission to university and into programs preparing for high paying careers. Grades on these exams appear on one's resume for decades. Large firms in Japan and Europe hire many entry level workers directly out of high school and base their selections on grades and exam scores.

In the US, by contrast, credentials signifying time spent in school are well rewarded but **most students realize few benefits from studying hard while in school**. This is a consequence of four phenomena:

* The labor market fails to adequately reward effort and achievement in high school. Even though achievement in math, science and English has large effects on job performance in clerical, technical, service and blue collar jobs, analysis of NLS Youth data demonstrates that during the first 8 years after high school graduation these competencies have no effect on the wage rates and earnings of young men. For young women, mathematical reasoning has a positive effect on wage rates but the effect is significantly smaller than the productivity effects of this competency. Many high schools do not send high school transcripts to employers when ex students request them to.

* Admission to selective colleges is not based on an absolute or external standard of achievement in high school subjects. It is based instead on aptitude tests which do not assess the high school curriculum and on such measures of student performance as class rank and grade point averages, which are defined relative to classmates' performances not relative to an external standard in the way scout merit badges or the English 'O' level exams are. AS A RESULT:

* The peer group actively discourages academic effort because studying hard shifts the grading curve up and makes it harder for classmates.

* Parents do not demand higher standards because this will not improve their child's GPA, rank in class or SAT score and it would put at risk what is really important--the diploma.

Policy Recommendations: The key to motivation is recognizing and rewarding learning effort and achievement. Learning accomplishments need to be described on an absolute scale (so that improvements in the quality and rigor of the teaching and greater effort by all students makes everybody better off) and signaled to employers. The following specific reforms are recommended:

* **Institute statewide achievement exams** which require essays and other extended answers (similar to NY's Regents Exams) and base college admissions decisions and merit scholarships on the results.
* **Establish new graduation credentials** ("Career Passport", "Competency Profile") which signal the student's learning accomplishments (measured by a criterion referenced scale) to the labor market.
* **Expand the Advanced Placement Program** by arranging for a large number of selective colleges to "strongly recommend" that applicants take and pass AP exams in both their junior and senior year and by awarding $100. AP Excellence Awards to students who pass the exams and funding summer training institutes for the AP teachers.
* **Replace the SAT exam**. Using scores on AP exams and state achievement exams to make college admission decisions will generate incentives to study and to upgrade one's local school.
* After 40 years it is time to **modernize the cognitive content of the GATB** by adding subtests measuring algebra, geometry, technical and scientific knowledge. This increases validity and strengthens incentives to study.
* **Employers should be encouraged to use high school grades and broad spectrum achievement tests like the ASVAB for hiring selections**.
* **All applicants for civil service jobs should be required to submit high school and college transcripts**.
* **Base Selection into the armed forces on competence in science and technical subjects not just English and math.**
* **Keep schools operating until 5 PM and all summer** offering enrichment programs to all students.

* **Require students who are lagging behind to attend remedial programs after school and during the summer.**
* **Institute Cooperative Learning**. Classroom recognition of team performance results in students urging other team members to study hard.

2/27/89

INCENTIVES FOR LEARNING: WHY AMERICAN HIGH SCHOOL STUDENTS COMPARE SO POORLY TO THEIR COUNTERPARTS OVERSEAS

by

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The scientific and mathematical competence of American high school students is generally recognized to be very low. The National Assessment of Educational Progress (NAEP) reports that only 7.5 percent of 17 year old students can "integrate specialized scientific information" (NAEP 1988a p.51) and 6.4 percent "demonstrated the capacity to apply mathematical operations in a variety of problem settings." (NAEP 1988b p. 42)

There is a large gap between the science and math competence of young Americans and their counterparts overseas. In the 1960s, the low ranking of American high school students in such comparisons was attributed to the fact that the test was administered to a larger proportion of American than European and Japanese youth. This is no longer the case. Figures 1 to 4 plot the scores in Algebra, Biology, Chemistry and Physics against proportion of the 18-year old population in the types of courses to which the international test was administered. In the Second International Math Study, the universe from which the American sample was drawn consisted of high school seniors taking a college preparatory math course. This group represents 13 percent of the age cohort, a proportion that is roughly comparable to the 12 percent of Japanese youth who were in their sample frame and is considerably smaller than the 19 percent of youth in the Canadian province of Ontario and the 50 percent of Hungarians who took the test. In Algebra, the mean score for this very select group of American students was about equal to the mean score of the much larger group of Hungarians and substantially below the Canadian achievement level (McKnight et al 1987).

The findings of the Second International Science Study are even more dismal. For example, the 25 % of Canadian 18-year olds taking chemistry know just as much chemistry as the very select 1 % of Americans high school seniors taking their second

FIGURE 1

ALGEBRA RESULTS FOR 17-YEAR-OLDS

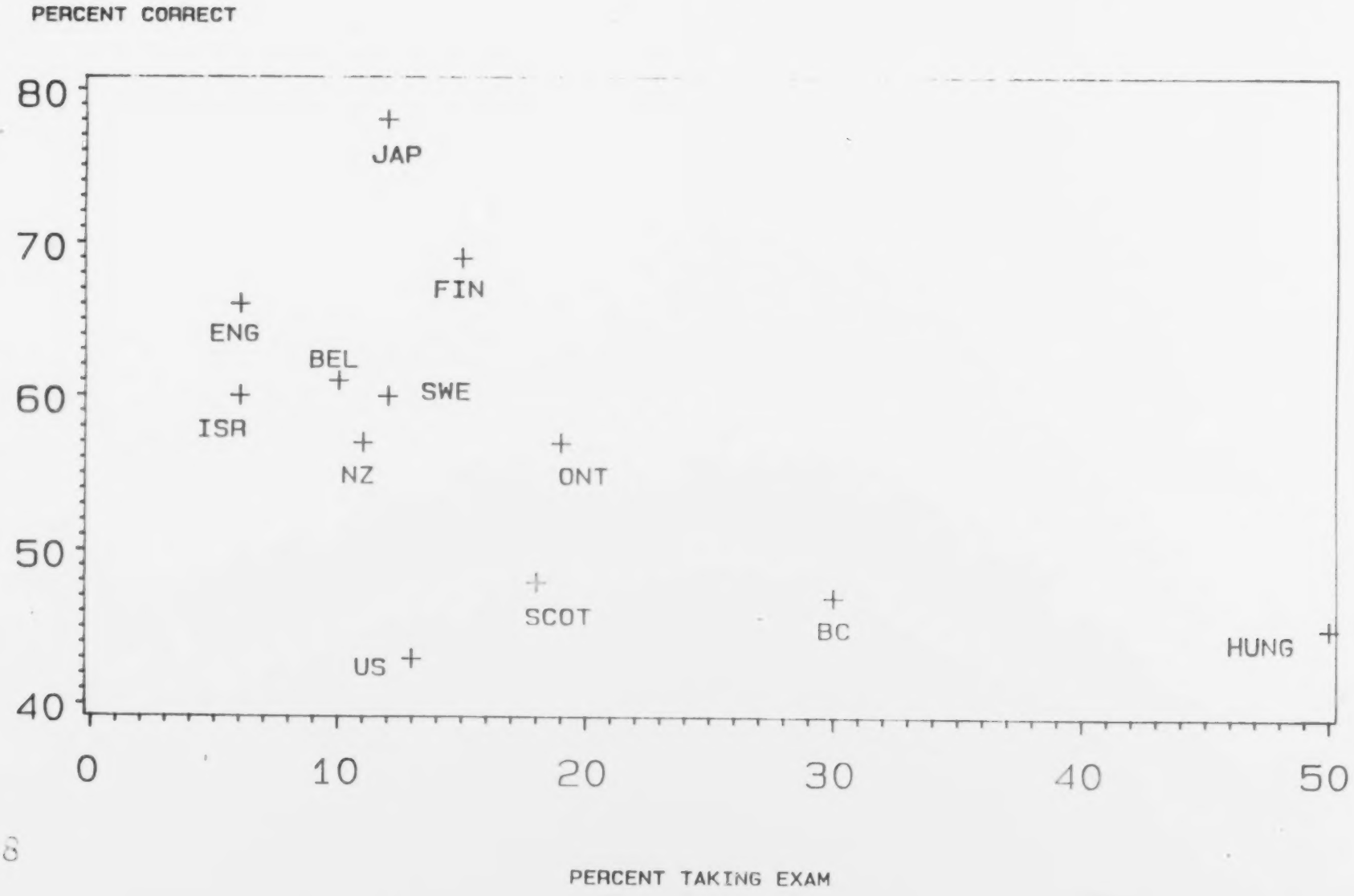


FIGURE 2

BIOLOGY RESULTS FOR 18-YEAR-OLDS

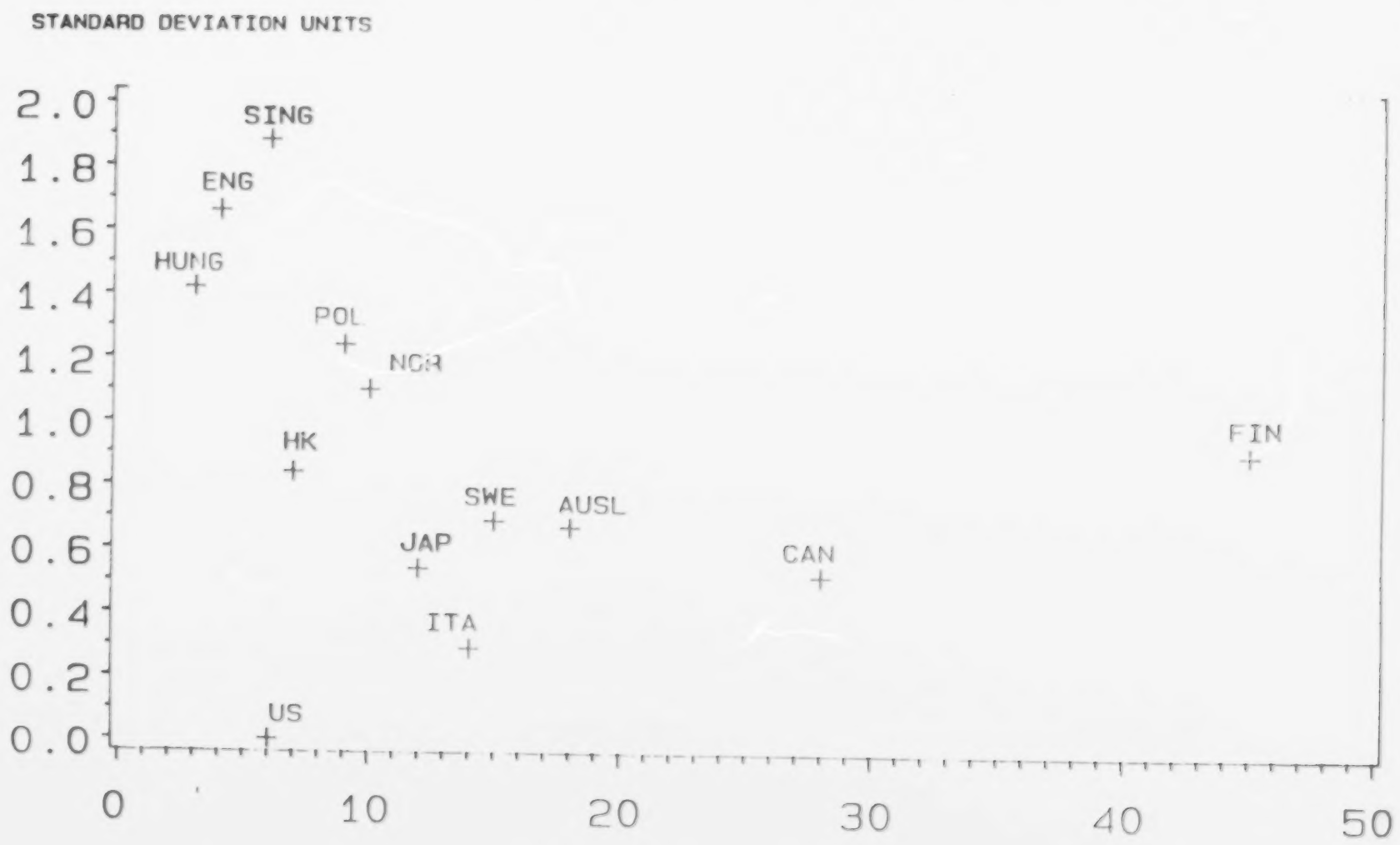


FIGURE 3

CHEMISTRY RESULTS FOR 18-YEAR-OLDS

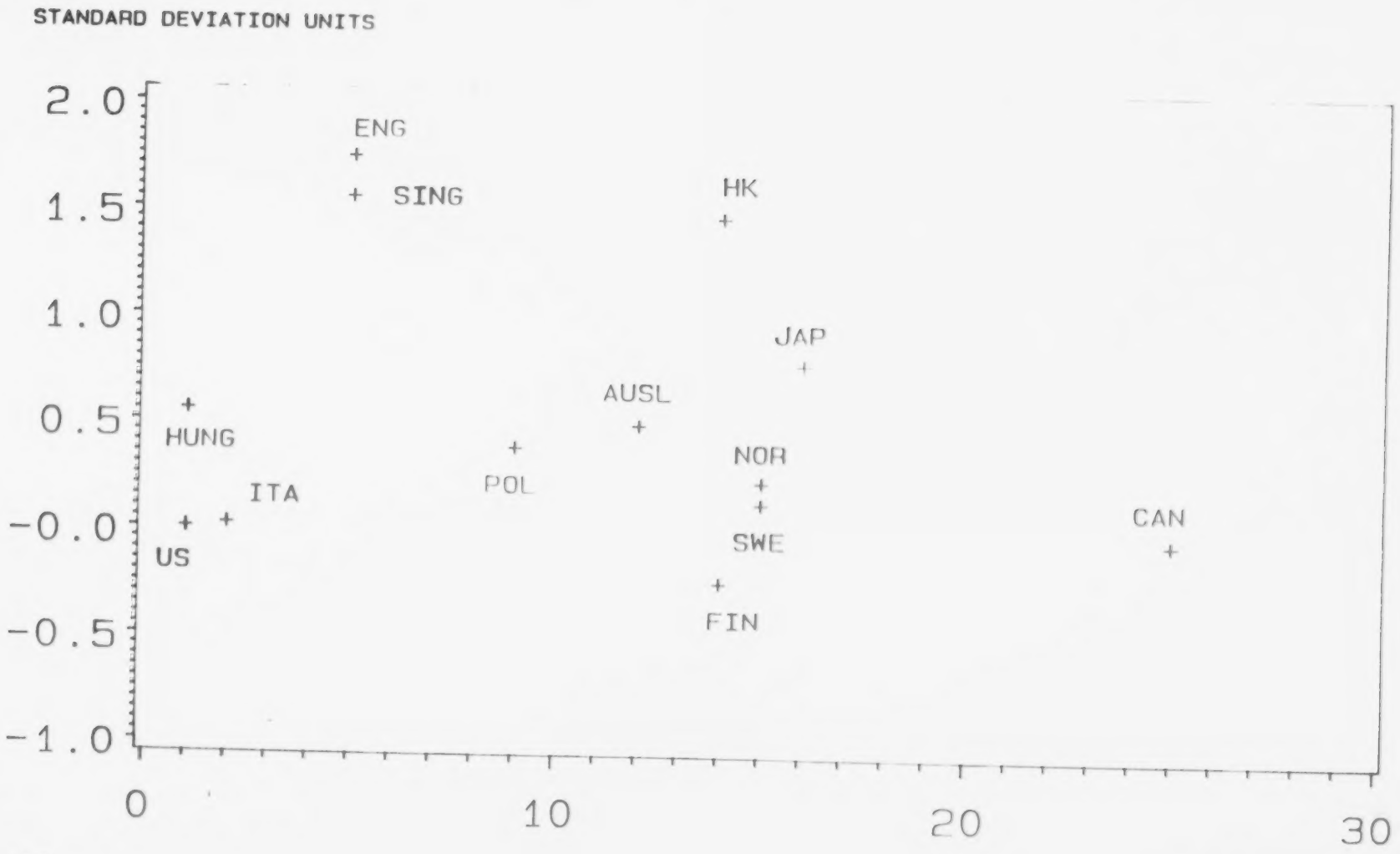
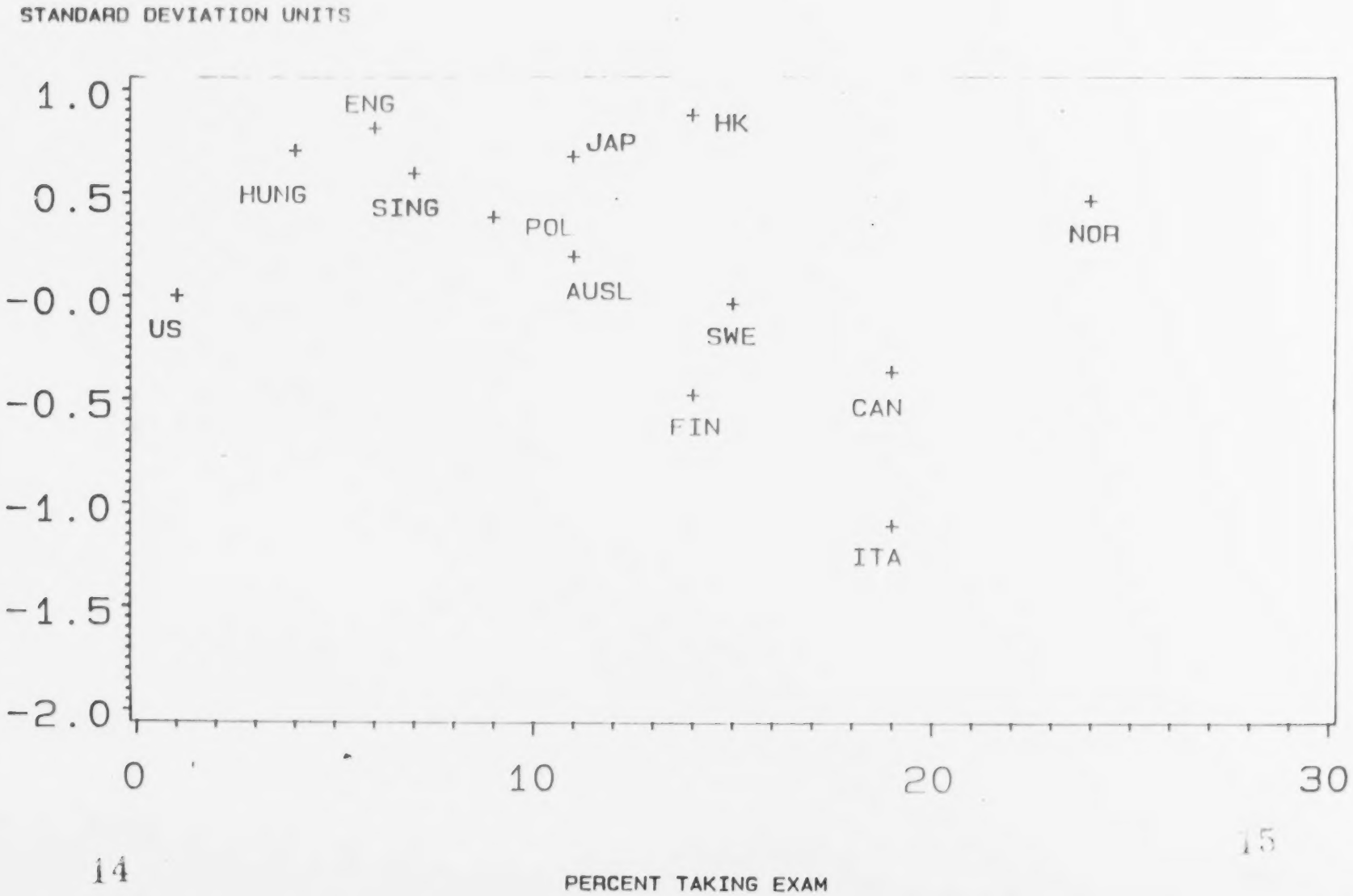


FIGURE 4

PHYSICS RESULTS FOR 18-YEAR-OLDS



chemistry course (most of whom are in "Advanced Placement"). The 28 % taking biology know much more than the 6 % of American 17-18 year olds who are taking their second biology course (International Association for the Evaluation of Educational Achievement, 1988).

(Figure 1-4 about here)

The poor performance of American students is sometimes blamed on the nation's "diversity". Many affluent parents apparently believe that their children are doing acceptably by international standards. This is not the case. In Stevenson, Lee and Stigler's (1986) study of 5th grade math achievement, the best of the 20 classrooms sampled in Minneapolis was outstripped by every single classroom studied in Sendai, Japan and by 19 of the 20 classrooms studied in Taipeh, Taiwan. The nation's top high school students rank far behind much less elite samples of students in other countries. In math and science the gap between Japanese high school students and their white American counterparts is more than twice the size of the two to three grade level equivalent gap between blacks and whites in the US. The learning deficit is pervasive.

The costs in terms of competitiveness and living standards of these educational deficits is very large. Bishop (1989) applied a growth accounting methodology to a related issue--the cost of the test score decline--and using conservative assumptions calculated the resulting reduction in GNP to be $86 billion in 1987 projected in real terms to double by the year 2000. The test score decline between 1967 and 1980 was only 1.25 grade level equivalents on average across all academic subjects; the deficit with respect to Japan in math and science (the only two subjects for which there are recent international comparisons) is more than 4 US grade level equivalents at the end of high school. Analysis of the NLS Youth Cohort data on wages and earnings and GATB revalidation data and military data on the association between tests and job performance has found that mathematical competencies are better predictors of job performance and wages than verbal competencies in the great bulk of blue collar and clerical jobs (Bishop 1987b, 1988b). If this is the case and the deficit is not substantially made up in college, extrapolations from the test score decline study would imply that the educational deficit could on its own produce a productivity differential between Japan and the United States of more than 10 percent. (At the exchange rate prevailing in February 1989, Japanese manufacturing workers

are paid roughly -- percent more than American manufacturing workers.)

This paper examines the causes of this learning deficit and then recommends policy measures for remedying the problems identified. Section 1 presents evidence that American students devote considerably less time and energy to learning in high school than their counterparts abroad.

Section 2 attributes the differences in learning effort to differences across societies in the structure and magnitude of the rewards for academic achievement. It is demonstrated that the US labor market under rewards learning achievements in high school and that the failure to signal learning achievements to employers is at the root of the American learning deficit. Section 3 examines the consequences for incentives to learn and the sorting of workers to jobs (both its efficiency and distributional ramifications) of the signals that employers base their hiring selections on. Section 4 sets forth a series of policy recommendations designed to improve student incentives to devote time and energy to learning and to strengthen parental incentives to demand that local schools be upgraded.

I. APATHY: THE PROXIMATE CAUSE OF THE LEARNING DEFICIT

American high school students do poorly in these international comparisons primarily because they devote a lot less time and energy to the task of learning. American students average nearly 20 absences a year; Japanese students only 3 a year (Berlin and Sum 1988). School years are longer in Europe and Japan. Forty-five percent of Japanese junior high school students attend Juku, private schools which provide tutoring in academic subjects (Leestma 1987). Thomas Rohlen has estimated that Japanese high school graduates average the equivalent of four more years in a classroom and studying than American graduates.

Studies of time use and time-on-task show that American students actively engage in a learning activity for only about half the time they are in high school. A study of schools in Chicago found that public schools with high-achieving students averaged about 75 % of class time for actual instruction; for schools with low achieving students, the average was 51 % of class time (Frederick, 1977). Other studies have found that for reading and math instruction the average engagement rate is about 75 % (Fischer et al., 1978; Goodlad, 1983; Klein, Tyle, and Wright, 1979;). Overall, Frederick, Walberg and

Rasher (1979) estimated 46.5 percent of the potential learning time was lost due to absence, lateness, and inattention.

In the High School and Beyond Survey students reported spending an average of 3.5 hours per week on homework. When homework is added to engaged time at school, the total time devoted to study, instruction, and practice is only 18-22 hours per week -- between 15 and 20 % of the student's waking hours during the school year. By way of comparison, the typical senior spent 10 hours per week in a part-time job and about 24 hours per week watching television (A. C. Neilsen unpublished data). Thus, TV occupies as much time as learning. Students in other nations spend much less time watching TV: 60% less in Switzerland and 44% less in Canada (Organization of Economic Cooperation and Development, Table 18.1, 1986). Japanese 5th graders spend 32.6 hours a week involved in academic activities while American youngsters devote only 19.6 hours to their studies (Stevenson, Lee and Stigler 1986). Science and mathematics deficits are particularly severe because most students do not take rigorous college preparatory courses in these subjects. The high school graduating class of 1982 took an average of only .43 credits of Algebra II, .31 credits of more advanced mathematics courses, .40 credits of chemistry and .19 credits of physics (Meyer 1988 Table A.2).

Even more important than the time devoted to learning is the intensity of the student's involvement in the process. At the completion of his study of American high schools, Theodore Sizer (1984) characterized students as, **"All too often docile, compliant, and without initiative**.(p. 54)" John Goodlad (1983) described: **"a general picture of considerable passivity among students...**(p. 113)". The high school teachers surveyed by Goodlad ranked "lack of student interest" and "lack of parental interest" as the two most important problems in education.

The student's lack of interest makes it difficult for teachers to be demanding. Sizer's description of Ms. Shiffe's class, illustrates what sometimes happens:

> Even while the names of living things poured out of Shiffe's lecture, no one was taking notes. She wanted the students to know these names. They did not want to know them and were not going to learn them. Apparently no outside threat--flunking, for example--affected the students. Shiffe did her thing, the students chattered on, even in the presence of a visitor....Their common front of uninterest probably made examinations moot. Shiffe could not flunk them all, and, if their performance was uniformly shoddy, she would have to pass them all. Her desperation was as obvious as the students cruelty toward her."(p. 157-158)

How does a teacher avoid this treatment? Sizer's description of Mr. Brody's class provides one example.

> He signaled to the students what the minima, the few questions for a test, were; all tenth and eleventh-graders could master these with absurdly little difficulty. The youngsters picked up the signal and kept their part of the bargain by being friendly and orderly. They did not push Brody, and he did not push them. The classroom was tranquil and bland. By my watch, over a third of the time was spent on matters other than history, and two-thirds of the classes ostensibly devoted to the subject were undemanding. Brody and his class had agreement, all right, agreement that reduced the efforts of both students and teacher to an irreducible and pathetic minimum.(p. 156)

Some teachers are able to overcome the obstacles and induce their students to undertake tough learning tasks. But for most, the student's lassitude is demoralizing. Everyone in the system recognizes the problem, but each group fixes blame on someone else. As one of my students put it:

> As it stands now, there is an unending, ever increasing cyclic problem. Teacher and administrator disinterest, apathy, and their lack of dedication results in students becoming even more unmotivated and docile, which in turn allows teachers to be less interested and dedicated. If students don't care, why should teachers? If teachers don't care, why should the students? (Krista, 1987)

Yes, it is a classic chicken versus egg problem. Teachers are assigned responsibility for setting high standards but we do not give them any of the tools that might be effective for inducing student observance of the academic goals of the classroom. They finally must rely on the force of their own personalities. All too often teachers compromise academic demands because the bulk of the class sees no need to accept them as reasonable and legitimate.

The Apathy of Parents and School Boards

The second major reason for the low levels of achievement by American students is parental and school board apathy. Japanese families allocate 10 percent of the family's income to educational expenses; American families only 2 percent. If American parents were truly dissatisfied with the performance of their local public schools, they would send their children to tuition financed schools offering an enriched and rigorous curriculum and

tutoring after school would be as common as it is in Japan. Most parents who send their children to private schools appear to be attracted by their stricter discipline and religious education not more rigorous academics and better qualified teachers.[1] Private school students do not learn at an appreciably faster rate than public school students (Cain and Goldberger 1983).

A comparative study of primary education in Taiwan, Japan and United States found that even though American children were learning substantially less in school, American parents were the most satisfied with the performance of their local schools (Stevenson, Lee and Stigler, 1986). Clearly American parents hold their children and schools to lower academic standards than Japanese and Taiwanese--as well as European--parents.

II. INCENTIVES: THE REAL CAUSE OF THE LEARNING DEFICIT

Incentives for Effort and Learning in High School

The fundamental cause of student and parental apathy is the absence of good signals of effort and learning in high school and a consequent lack of rewards for effort and learning. Signals of learning like years of schooling are handsomely rewarded. In 1985 25 to 34 year old male (female) college graduates working full time full year earned 38 (40) percent more than comparable high school graduates and high school graduates earned 23 (16) percent more than high school dropouts. These rewards have significant effects on student enrollment decisions. When the payoff to a college degree for white males fell in the early 1970s, the college attendance rates of white males fell substantially (Freeman 1976b). When the payoff to college rose again during the late 1970s and 1980s, male college attendance rates rose as well. Years of schooling is only a partial measure of learning accomplishment, however.

In contrast to years spent in school, the effort devoted to learning in high school and the actual competencies developed in high school are generally not well signaled to colleges and employers. Consequently, while students are generously rewarded for staying in school, most students realize few benefits from working hard while in school. The lack of incentives for effort and learning accomplishment is a consequence of three phenomena:

* The labor market fails to reward effort and achievement in high school.
* The peer group actively discourages academic effort.

* Admission to selective colleges is not based on an absolute or external standard of achievement in high school subjects. It is based instead on aptitude tests which do not assess the high school curriculum and on such measures of student performance as class rank and grade point averages, which are defined relative to classmates' performances not relative to an external standard.

2.1 The Absence of Major Economic Rewards for Effort in High School

Students who plan to look for a job immediately after high school typically spend less time on their studies than those who plan to attend college. In large part, most see very little connection between how much they learn and their future success in the labor market. Less than a quarter of 10th graders believe that geometry, trigonometry, biology, chemistry and physics are needed to qualify for their first choice occupation (Longitudinal Survey of American Youth 1988). Statistical studies of the youth labor market confirm their skepticism about the benefits of taking tough courses and studying hard:

- Employers rank "reading, writing, math and reasoning ability" number 5 on a list of 6 abilities they look for when hiring (Survey of the National Federation of Independent Business [NFIB] membership)[2].

- For students seeking part-time employment while attending high school, grades and performance on academic achievement/aptitude tests have essentially no impact on labor market success. They have -
  - -- no effect on the chances of finding work when one is seeking it during high school, and
  - -- no effect on the wage rate of the jobs obtained while in high school (Hotchkiss, Bishop & Gardner, 1982).

- As one can see in table 1, for those who do not go to college full-time, high school grades and test scores had -
  - -- no effect on the wage rate of the jobs obtained immediately after high school in Kang and Bishop's (1984) analysis of High School and Beyond seniors and only a 1 to 4.7 % increase in wages per standard deviation improvement in test scores and grade point average in Meyer's (1982) analysis of Class of 1972 data.
  - -- a moderate effect on wage rates and earnings after 4 or 5 years [Gardner (1982) found an effect of 4.8 % per standard deviation of achievement and Meyer (1982) found an effect of 4.3 to 6.0 % per standard deviation of achievement],
  - -- a small negative effect on the risk of unemployment immediately after high school.

[Figure 5 and 6 about here]

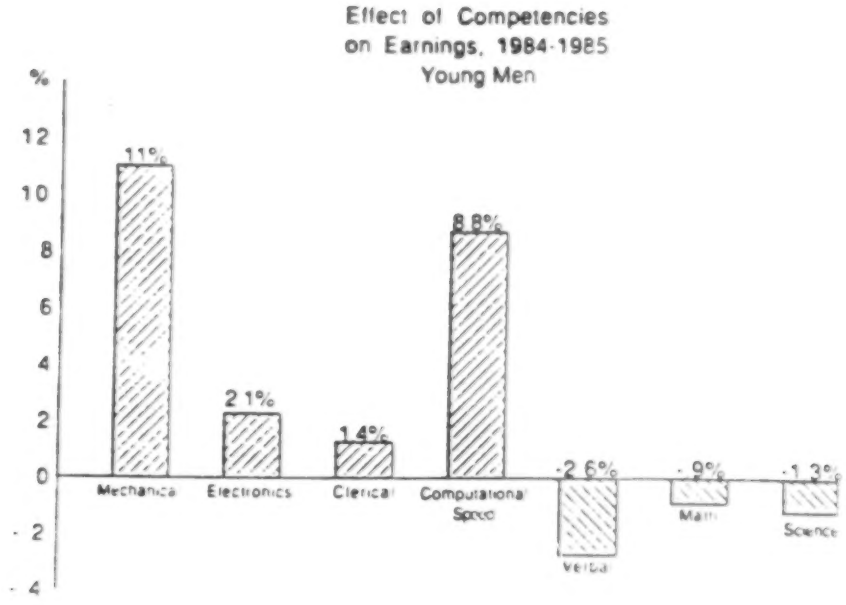
Table 1

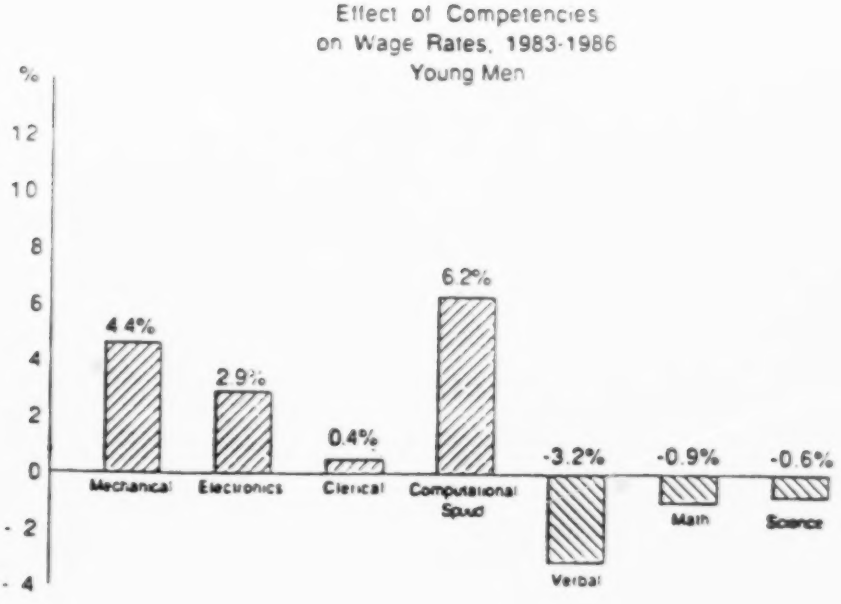
Effect of Academic Achievement
on the Wage Rates of High School Graduates

Study and Data Set	Date of Graduation	Age	Achievement Measures	Percent Change in Wage Rate Male	Female
Wage Rates					
Kang & Bishop (1985)	1980	19	Test-Math,Voc,Read	-1.9	-.5
High School & Beyond			GPA in Grade 12	.6	2.2
Gardner (1983)	1976-1982	19-24	AFQT	4.8	4.8
NLS Youth					
Daymont & Rumberger	1976-1979	19-21	GPA in Grade 9	.3	2.7
NLS Youth (1982)					
Meyer (1982)	1972	19	Class Rank Grade 12	0.0	2.5
(Weekly earnings)			Test Composite	1.2	2.2
Class of 1972					
Earnings					
Hause (1975)	1961	19	IQ,Test-Math	-3.7	--
Project Talent (white)		23	IQ,Test-Math	6.1	--

The table reports the percentage response of the wage rate or earnings to a one standard deviation improvement in a measure of academic achievement. For high school seniors a one standard deviation differential on an achievement test is about equal to 3.5 grade level equivalents or 110 points on the Verbal SAT. For GPA, one standard deviation is about .7 when C's = 2.0, B's = 3.0 and A's = 4.0.

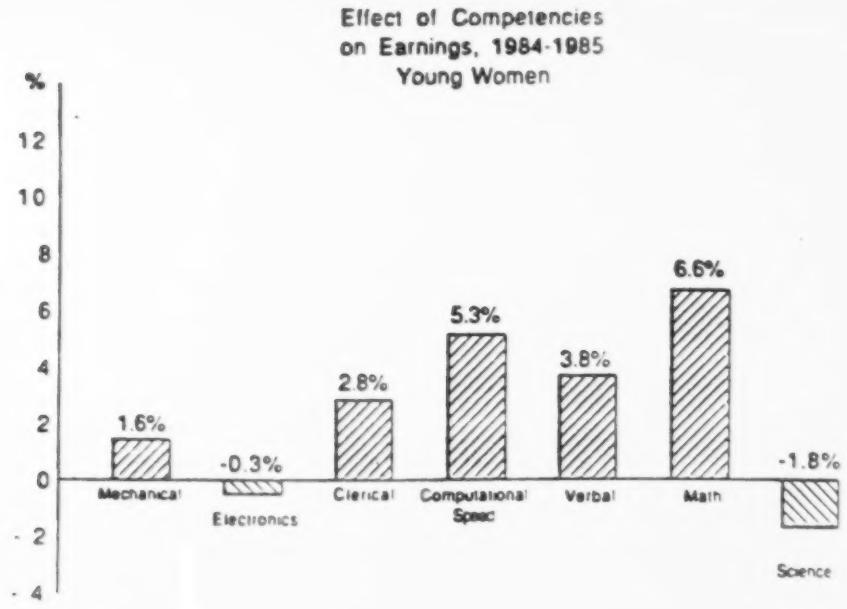
FIGURE 5

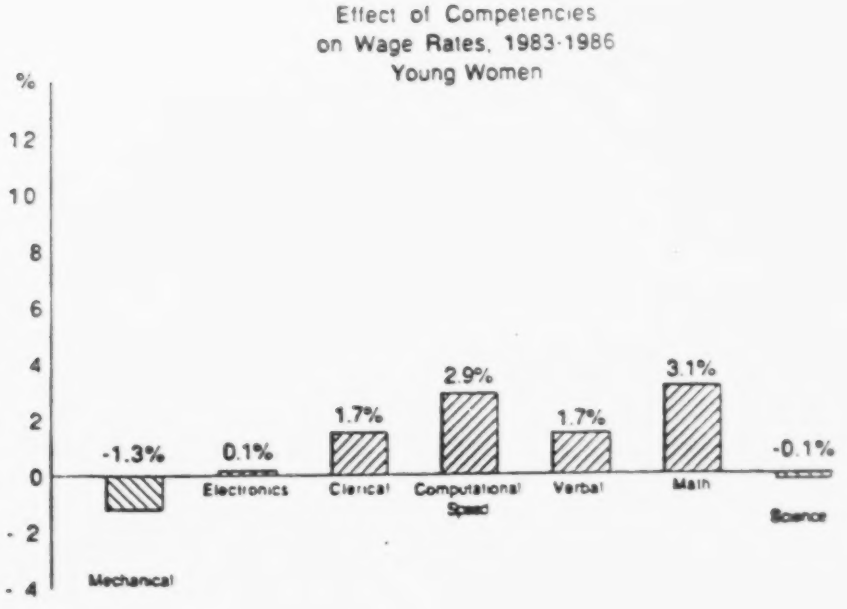




Source: Analysis of NLS Youth data. The figure reports the effect of a one population standard deviation increase in Armed Services Vocational Aptitude Battery subtest while controlling for schooling, school attendance, age, work experience, region, SMSA residence and ethnicity.

FIGURE 6





Source: Analysis of NLS Youth data. The figure reports the effect of a one population standard deviation increase in Armed Services Vocational Aptitude Battery subtest while controlling for schooling, school attendance, age, work experience, region, SMSA residence and ethnicity.

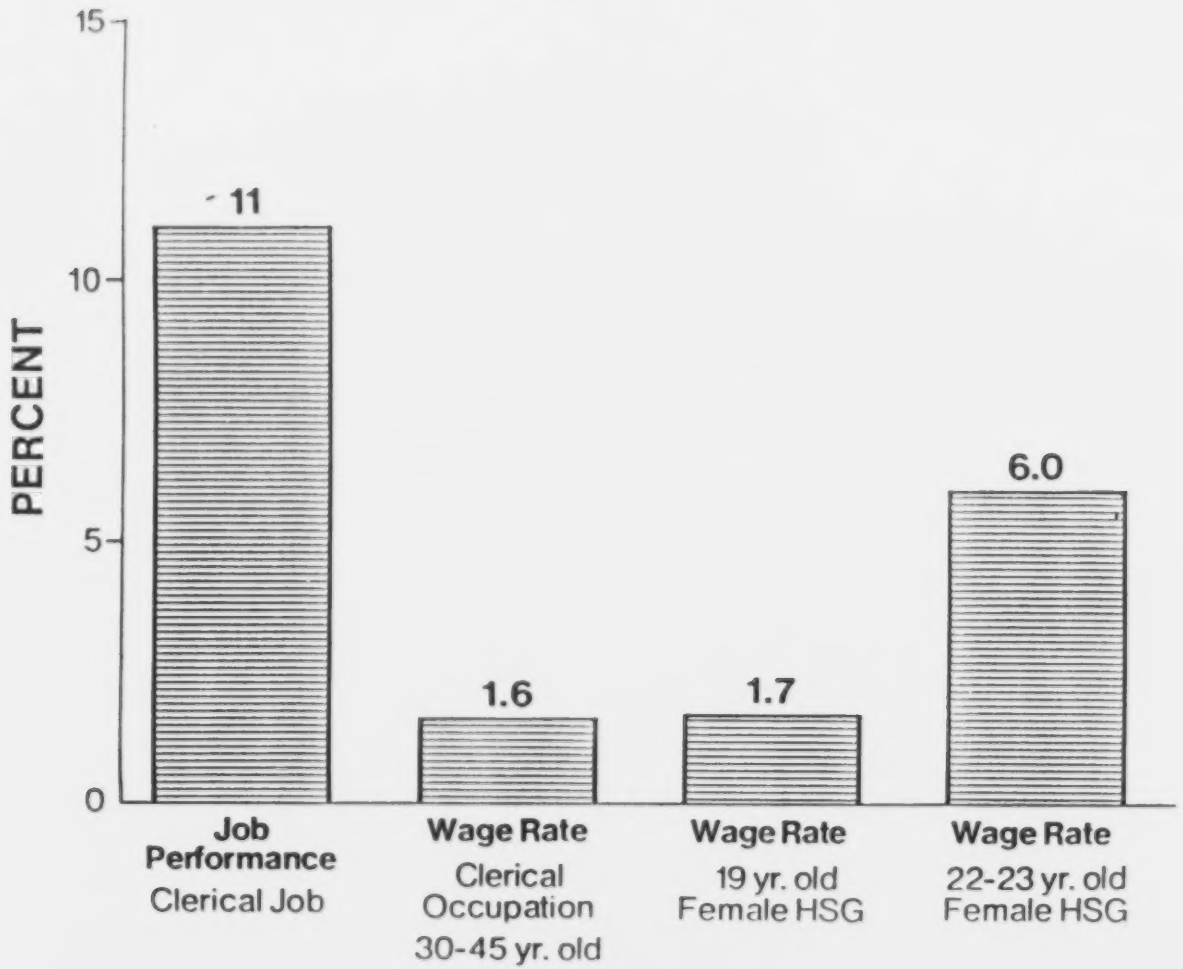
- Results of an analysis of the Youth Cohort of the National Longitudinal Survey are summarized in figures 5 and 6 (Bishop, 1988). It was found that during the first 8 years after leaving high school, young men received **no** rewards from the labor market for developing competence in science, language arts and mathematical reasoning. The only competencies that were rewarded were speed in doing simple computations (something that calculators do better than people) and technical competence (knowledge of mechanical principles, electronics, automobiles and shop tools). For the non-college bound female, there were both wage rate and earnings benefits to learning advanced mathematics but no benefits to developing competence in science or the technical arena. Competence in language arts did not raise wage rates but it did reduce the incidence of unemployment. The payoff to science, language arts and mathematical reasoning competency was higher for female college graduates than for female high school graduates. For both males and females, age increased the payoff to computational speed but had no effect on the payoff to the verbal, scientific and mathematical reasoning competencies.

The long delay before labor market rewards are received is important because most teenagers are short sighted and liquidity constrained, so benefits promised for 10 years in the future may have little influence on their decisions.

Although the economic benefits of higher achievement to the employee are quite modest and do not appear until long after graduation, the benefits to the employer (and therefore, to national production) are immediately realized in higher productivity. Over the last 80 years, industrial psychologists have conducted hundreds of studies, involving hundreds of thousands of workers, on the relationship between productivity in particular jobs and various predictors of that productivity. They have found that scores on tests measuring competence in reading, mathematics, science and problem solving are strongly related to productivity in almost all of the civilian jobs studied[3](Ghiselli 1973; Hunter and Hunter 1983). Studies conducted by the military similarly find that scientific, technical and mathematical reasoning competencies have large effects on both paper and pencil measures of job knowledge and hands-on measures of job performance (Hunter, Crosson and Friedman 1985; Bishop 1988b).

Figure 7 compares the percentage effect of mathematical and verbal achievement (specifically a difference of three grade level equivalents in test scores or .7 GPA points (on a 4 point scale) on the productivity of a clerical worker, on wages of male clerical workers (Taubman & Wales, 1975), and on the wages of young women who have not gone to college (Kang & Bishop, 1984; Meyer, 1982). Productivity clearly increases much more

Figure 7


15
10
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PERCENT
11
1.6
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6.0
Job Performance
Clerical Job
Wage Rate
Clerical Occupation
30-45 yr. old
Wage Rate
19 yr. old Female HSG
Wage Rate
22-23 yr. old Female HSG

than wage rates.[4] Apparently, when a non-college-bound student works hard in school and improves his or her competence in language arts, science and mathematical reasoning, the youth's employer reaps much of the benefit. The youth is more likely to find a job, but not one with an appreciably higher wage.

(Figure 7 about here)

Reasons for the Discrepancy between Wage Rates and Productivity on the Job

Why doesn't competition between employers result in much higher wages for those who achieve more in high school? The lack of objective information available to employers on applicant accomplishments, skills, and productivity explains much. Tests are available for measuring competency in reading, writing, mathematics, science, and problem solving, but EEOC guidelines resulted in a drastic reduction in their use after 1971. A 1987 survey of a stratified random sample of small-and medium-sized employers who were members of the National Federation of Independent Business [NFIB] found that aptitude test scores had been obtained in only 2.9 % of the hiring decisions studied.

Other potential sources of information on effort and achievement in high school are transcripts and referrals from teachers who know the applicant. Both are under-used. In the NFIB survey, transcripts had been obtained prior to the selection decision for only 14.2 % of the high school graduates hired. If a student or graduate has given written permission for a transcript to be sent to an employer, the Buckley amendment obligates the school to respond. Many high schools are not, however, responding to such requests. The experience of Nationwide Insurance, headquartered in Columbus Ohio, is probably representative. The company obtains permission to get high school records from all young people who interview for a job. It sent over 1,200 signed requests to high schools in 1982 and received only 93 responses. The company reported that colleges were more responsive. Most high schools have apparently designed their systems for responding to requests for transcripts around the needs of college-bound students rather than the students who seek jobs immediately after graduating.

There is an additional barrier to the use of high school transcripts in selecting new employees--when high schools do respond, it takes a great deal of time. For Nationwide

Insurance the response almost invariably took more than 2 weeks. Given this time lag, if employers required transcripts prior to making hiring selections, a job offer could not be made until a month or so after an application had been received. Most jobs are filled much more rapidly than that.

The only information about school experiences requested by most employers is years of schooling, diplomas and certificates obtained, and area of specialization. Only 15 percent of the NFIB employers asked applicants with 12 years of schooling to report their grade point average. The lack of questions about school performance on the job application does not reflect an employer belief that school performance is a poor predicator of job performance. When employers have grade point average information, it has a major effect on the ratings employers assign to job applicants in policy capturing experiments (Hollenbeck and Smith, 1984). The absence of questions about grades from most job applications probably reflects the low reliability of self reported data, the difficulties of verifying it, and the fear of EEO challenges to such questions.

Hiring on the basis of recommendations by high school teachers is also uncommon. In the NFIB survey, when a high school graduate was hired, the new hire had been referred or recommended by vocational teachers only in 5.2 % of the cases and referred by someone else in the high school in only 2.7 %.

Clearly, hiring selections and starting wage rates often do not reflect the competencies and abilities students have developed in school. Instead, hiring decisions are based on observable characteristics (such as years of schooling and field of study) that serve as signals for the competencies the employer cannot observe directly. A study of how individual wage rates varied with initial job performance found that when people hired for the same or very similar jobs are compared, someone who is 20 % more productive than average is typically paid only 1.6 % more. After a year at a firm, better producers received only a 4% higher wage at nonunion firms with about 20 employees, and they had no wage advantage at unionized establishments with more than 100 employees or at nonunion establishments with more than 400 employees (Bishop, 1987a).

Employers have good reasons for not varying the wage rates of their employees in proportion to their perceived job performance. All feasible measures of individual productivity are unreliable and unstable. In most cases measurement must be subjective.

Workers are risk averse and reluctant to accept jobs in which the judgement of one supervisor can result in a large wage decline in the second year on the job (Hashimoto and Yu 1980; Stiglitz 1974). Most productivity differentials are specific to the firm, and this reduces the risk that not paying a particularly productive worker a comparably higher salary will result in him going elsewhere (Bishop, 1987a). Pay that is highly contingent on performance can also weaken cooperation and generate incentives to sabotage others (Lazear 1986). Finally, in unionized settings, the union's opposition to merit pay will often be decisive.

Despite their higher productivity, young workers who have achieved in high school do not receive appreciably higher wage rates after high school. The student who works hard must wait many years to reap rewards, and even then the magnitude of the wage and earnings effect--a 1 to 2 % increase in earnings per grade level equivalent on achievement tests--is hardly much of an incentive. It is considerably smaller than the actual gain in productivity that results.

2.2 The Zero-Sum Nature of Academic Competition in High School

The second root cause of high school students' poor motivation is peer pressure against studying hard. The primary reason for peer pressure against studying is that pursuing academic success forces students into a zero-sum competition with their classmates. Their achievement is not being measured against an absolute, external standard. In contrast to scout merit badges, for example, where recognition is given for achieving a fixed standard of competence, the schools' measures of achievement assess performance relative to fellow students through grades and class rank. When students try hard to excel, they set themselves apart, cause rivalries and may make things worse for friends. When we set up a zero sum competition among close friends, we should not be surprised when they decide not to compete. All work groups have ways of sanctioning "rate busters." High school students call them "brain geeks," "grade grubbers," and "brown nosers."

Young people are not lazy. In their jobs after school and on the football field, they work very hard. In these environments they are part of a team where individual efforts are

visible and appreciated by teammates. Competition and rivalry are not absent, but they are offset by shared goals, shared successes and external measures of achievement (i.e. satisfied customers or winning the game). On the sports field, there is no greater sin than giving up, even when the score is hopelessly one sided. On the job, tasks not done by one worker will generally have to be completed by another. In too many high schools, when it comes to academics, a student's success is purely personal.

The second reason for peer norms against studying is that most students perceive the chance of receiving recognition for an academic achievement to be so slim they have given up trying. At most high school awards ceremonies, the academic recognition goes to only a few--those at the very top of the class. By 9th grade, most students are already so far behind the leaders, that they know they have no chance of being perceived as academically successful. Their reaction is often to dismiss the students who take learning seriously and to honor other forms of achievement--athletics, dating, holding their liquor, and being "cool"--which offer them better chances of success.

2.3 Incentives to Upgrade Local Schools

The lack of external standards for judging academic achievement and the resulting zero sum nature of academic competition in the school also influences parents, school boards, and local school administrators. Parents can see that setting higher academic standards or hiring better teachers will not on average improve their child's rank in class or GPA. And raising standards at their daughter's high school will have only minor effects on how she does on the SAT, so why worry about standards? In any case, doing well on the SAT matters only for those who aspire to attend a selective college. Most students plan to attend open entry public colleges which admit all high school graduates from the state with the requisite courses. Scholarships are awarded on the basis of financial need, not academic merit.

The parents of children not planning to go to college have an even weaker incentive to demand high standards at the local high school. They believe that what counts in the labor market is getting the diploma, not learning algebra. They can see that learning more will be of only modest benefit to their child's future, and that higher standards might put

at risk what is really important--the diploma.

Only when educational outcomes are aggregated, at the state or national levels, do the real costs of mediocre schools become apparent. The whole community loses because the work force is less efficient, and it becomes difficult to attract new industry. Competitiveness deteriorates and the nation's standard of living declines. This is precisely why employers, governors, and state legislatures have been the energizing force of school reform. State governments, however, are far removed from the classroom, and the instruments available to them for inducing improvements in quality and standards are limited.

The number of academic courses required for graduation has been increased but research shows that learning gains in math, science, social studies and English are a function of the rigor not the number of courses taken (Bishop 1985). States do not have effective control of the standards and expectations that prevail in the classroom. Even in New York State where state administered examinations give the Board of Regents a great deal of power over what is taught, taking Regents courses is voluntary and the use of Regents exam scores as grades is at the option of the teacher and the local school board.

State aid can be increased but econometric studies of local school expenditures suggest that only a portion of such increases result in permanent increases in local school spending. The rest ends up slowing the rate of increase of property taxes.

A consensus appears to have emerged that the first wave of top down reforms had only modest effects and that a new wave of bottom up reform "empowering" teachers and principals is required. A local superintendent admitted to me, however, that with out the pressure from the state he was doubtful anything would be done. Reformers are hoping that the publication of comparative data on student performance in different school districts and the threat of state takeover of local school districts will spur principals, teachers and local school boards to upgrade the schools. While publishing performance data has a positive effect, the practice is already wide spread and cannot be expected to produce further major improvements in standards and outcomes. In our system all the really important decisions--budget allocations, hiring selections, salary levels, homework assignments, teaching strategies, grading standards, course offerings, pupil assignments to courses and programs, disciplinary policies, etc.--are made by classroom teachers and

school administrators who are responding to local political pressures. If the parents voting in school board elections, do not believe that a more rigorous math and science curriculum will help their children get a better job or into the college of their choice, state mandates designed to raise standards in these courses will have no lasting effect.

2.4 Incentives to Learn in Other Nations

The tendency not to reward effort and learning in high school appears to be a peculiarly American phenomenon. Marks in school are the major determinant of who gets the most preferred apprenticeships in Germany. In Canada, Australia, Japan, and Europe, educational systems administer achievement exams which are closely tied to the curriculum. Performance on these exams is the primary determinant of admission to a university and to a field of study. Job applications, at all levels, require information about exam grades. In Ireland, for example, secondary school graduates applying for clerical and blue collar jobs put their final examination grades on their resumes (see Exhibit 1 and 2). Good grades on the toughest exams--physics, chemistry, advanced mathematics--carry particular weight with employers and universities.

In Japan, clerical, service and blue collar jobs at the best firms are available only to those who are recommended by their high school. The most prestigious firms have long term arrangements with particular high schools to which they delegate the responsibility of selecting the new hire(s) for the firm. The criteria by which the high school is to make its selection is, by mutual agreement, grades and exam results. In addition, most employers administer their own battery of selection tests prior to hiring. The number of graduates that a high school is able to place in this way depends on its reputation and the company's past experience with graduates from the school. Schools know that they must be forthright in their recommendations because if they fail just once to make an honest recommendation, the relationship will be lost and their students will no longer be able to get jobs at that firm (Rosenbaum and Kariya 1987).

Parents in these countries know that a child's future depends critically on how much is learned in secondary school. In many countries the options for upper secondary schooling depend primarily on the child's performance in lower secondary school, not on where the parents can afford to live as in the US. Since the reputation of the high school

Exhibit 1

C U R R I C U L U M V I T A E

NAME:

ADDRESS:

DATE OF BIRTH: AGE:

NATIONALITY:

TELEPHONE NO:

EDUCATIONAL DETAILS

Primary School

Post Primary

Secretarial Course

Office Procedures Course

EXAMINATIONS

Intermediate Certificate 1985

SUBJECTS		
	English	B - L.C.
	Irish	C - L.C.
	Maths	B - L.C.
	Science	C
	Geography	C
	History	C
	Home Economics	D

Leaving Certificate 1987

SUBJECTS		
	English	D - L.C.
	Irish	C - L.C.
	Maths	C - L.C.
	Biology	C - H.C.
	Geography	C - L.C.
	French	D - L.C.
	Home Economics	B - L.C.

CURRICULUM VITAE

Exhibit 2

Name ;

Address ;

Date of Birth ;

Place of Birth ;

Nationality ;

Marital Status ;

Occupation ;

Father's name ;

Occupation ;

EDUCATION :

August 1980 - June 1985.
(All five years were spent learning through Irish.)

U.C.D.

QUALIFICATIONS :

Subject:	Intermediate Cert. (June 1983)	Leaving Cert. (June 1985)
Irish	C (H)	C (H)
English	D (H)	C (H)
Mathematics	B (H)	A (P)
French	D	C (P)
German	D	---
Science	A	---
Chemistry	---	C (H)
Physics	---	C (H)
History	B	C (H)
Geography	B	---

is so important, the competitive pressure often reaches down into junior high school. National exams are the yardstick, so achievement tends to be measured relative to everyone else's in the nation and not just relative to the child's classmates. As a result, parents in most other Western nations demand more and get more from their local schools than we do and yet, nevertheless, are more dissatisfied with their schools than American parents.

Japanese adolescents work extremely hard in high school, but this changes once they enter college. For most students, a country club atmosphere prevails. The reason for the change in behavior is that employers apparently care only about which university the youth attends, not about the individual's academic achievement at the university. Studying very hard is not a national character trait, it is a response to the way Japanese society rewards academic achievement.

American students, in contrast, take it easy in high school but generally work substantially harder in college. This change is in part caused by the fact that when higher level jobs requiring a bachelors or associates degree are being filled, employers pay more attention to grades and teacher recommendations than when they hire high school graduates. The NFIB survey found that when college graduates were hired, 26.5 percent of the employers had reviewed the college transcript before making the selection, 7.8 percent had obtained a recommendation from a major professor and 6.3 percent had obtained a recommendation from a professor outside of the graduate's major or from the colleges's placement office.

III. EMPLOYER SELECTION CRITERIA: IS THERE A TRADEOFF BETWEEN SORTING EFFICIENCY AND INCENTIVES TO LEARN ?

The lack of true engagement in learning and the apathy of local political systems regarding the quality of local schools is to an important degree a consequence of the failure of employers to reward students for real learning achievements. The solution is for employers (particularly those with attractive jobs) to use of academic achievement as an important selection criterion when hiring recent high school graduates. Academic achievement is not directly observable, however, so employers must base their decisions on imperfect signals of true achievement. The incentive effects of employer hiring behavior depend on which signals they choose to use. The sorting of workers to jobs will also

depend on this choice. Thus the choice of a signal of academic achievement has efficiency and distributional effects as well as incentive effects and these effects need to be examined. In particular we must investigate whether there is a tradeoff between the goal of generating incentives to learn and the efficient sorting of workers to jobs?

The distributional consequences of making academic achievement a more important factor in hiring selections are not difficult to project. The beneficiaries will be women generally, those attending schools that have good teachers and maintain high standards and those who study hard in school. The losers will be men, blacks, Hispanics, those attending poor schools and those not putting much effort into their studies. Adverse impacts on blacks and Hispanics can be avoided by race/ethnicity norming the test scores (as the GATB currently does) and affirmative action. Consequently, impacts on minority groups should not be the basis for deciding whether to select workers on the basis of academic achievement (or what measures of academic achievement to use). Other instruments are available for achieving societal goals regarding integration on the job. When, however, it comes to generating incentives to develop the skills needed on the job and efficient matching of workers to jobs, there appears to be no other selection instrument that will sort efficiently while generating the correct incentives quite as well as measures of academic achievement will. These are the two criteria by which alternative employee selection policies should be evaluated. That is the task undertaken in this section of the paper.

Sorting efficiency will tend to be maximized when separate competencies are measured and employers select workers with the particular combination of competencies that are needed in its jobs. In other words, effort should be made to maximize differential validity. Measures of academic achievement should be used but they should supplement not displace consideration of occupationally relevant training and experience. If most of the people hired into an entry job move up to other more responsible positions, the criteria applied at the port of entry needs to take the higher level jobs into account.

The analysis presented in the first part of the paper implies that student incentives to learn and parental incentives to demand a quality education are maximized when the following is true: (1) significant economic rewards depend directly and visibly on academic accomplishments, (2) the accomplishment is defined relative to an externally imposed standard of achievement and not relative to one's classmates, (3) the reward is received

quickly, (4) everyone, including those who begin high school with serious academic deficiencies, has an achievable goal which will generate a significant reward and (5) progress toward the goal can be monitored by the student, parents and teachers.

We will see shortly that it is not easy to design a system of signaling and certifying academic achievement which satisfies all of these requirements. Consequently, it will generally be desireable to use more than one signal of academic achievement and to use different signals when selecting for different jobs. Let us examine the alternatives.

Diplomas:

High school diplomas and college degrees are effective devices for generating incentives to enroll in school. The standard diploma does not, however, generate incentives to attend regularly or to study hard. Establishing a minimum competency level for receiving a high school diploma only slightly improves incentives. Some students arrive in high school so far behind and the consequences of not getting a diploma are so severe, minimum competency standard are not set very high (and cannot in good conscience be set too high given the constraints on the system). Once they satisfy the minimum, many students stop putting effort into their academic courses.

Schooling is a valid predictor of job performance but to a great degree its validity derives from its correlation with test scores. The evidence on its incremental contribution to validity once test scores are controlled is more mixed. An analysis of GATB revalidation data by Bishop (1987b) found very weak effects of schooling but this is probably an artifact of the selection biases (Mueser and Maloney 1988). Selection into the military is based explicitly on the test scores and high school graduation, not on unobservables as in the civilian sector. Since selection is based on X variables, selection effects can be corrected for (Dunbar and Linn 1986). Analysis of military data finds that high school graduation has its own unique impacts when test scores are controlled. Weiss's (1985) study of Western Electric employees found that completing high school is a valid predictor of low absenteeism and low turnover but not job performance. Thus even when studies find that graduating from high school has little effect on job performance, it appears to effect retention. Consequently, from a sorting efficiency point of view, the high school diploma belongs on the list of credentials considered by employers even when test

scores are available.

Competency Profiles:

Competency profiles are check lists of competencies that a student has developed through study and practice. The ratings of competence that appear on a competency profile are relative to an absolute standard, not relative to other students in the class. By evaluating students against an absolute standard, the competency profile prevents one student's effort from negatively affecting the grades received by other students. It encourages students to share their knowledge and teach each other.

A second advantage of the competency profile approach to evaluation is that students can see their progress as new skills are learned and checked off. The skills not yet checked off are the learning goals for the future.
Seeing such a check list getting filled up is inherently reinforcing.

With a competency profile system, goals can be tailored to the student's interests and capabilities, and progress toward these goals can be monitored and rewarded. Students who have difficulty in their required academic subjects can, nevertheless, take pride in the occupational competencies that they are developing and which are now recognized just as prominently as course grades in academic subjects. Upon graduation, the competency profile would be encased in plastic and serve as a credential certifying occupational competencies. If the ratings by teachers (and the sponsoring employers of cooperative education students) are reliable indicators of competence, employers will find this information very valuable, and the students who build a good record will be handsomely rewarded.

Hiring Based on Grades in High School:

Using grades to select new hires results in a very visible dependence of labor market outcomes on an indicator of academic accomplishment. There are, however, two disadvantages. It results in zero-sum competition between classmates and consequently contributes to peer pressure against studying and parental apathy about the quality of teaching and the rigor of the curriculum. The second problem is that it induces students to select easy courses and thus tends to cause grade inflation. These problems can be mitigated somewhat if employers take the rigor of courses into account when evaluating

grades, give preference to schools with tough grading standards, and vary the number hired from particular schools in response to the actual job performance of past hires from that school. From the sorting point of view, the disadvantage of high school GPA is that it has low validity when there are no adjustments made for grading standards and it is difficult for employers to make such adjustments.[5]

Job Tryout and Promotions Based on Performance:

From the point of view of motivating students to study, the problem with job tryout and performance reward systems is that the dependence of labor market outcomes on academic achievements is both invisible and considerably delayed.

From the efficiency point of view, the disadvantages of job tryout are the costs of training workers who end up being fired, its unpopularity with workers who will spend months unemployed if they are fired, and its potential for generating grievances. Performance evaluations are known to be unreliable, and this makes workers reluctant to take jobs in which next year's pay is highly contingent on one supervisor's opinion. Pay that is highly contingent on performance can also weaken cooperation and generate incentives to sabotage others. The benefits of performance reward systems are that they motivate better performance, they tend to attract high performers to the firm, and they tend to induce the high performers to stay at the firm. When these factors are balanced, it appears that most workers and employers choose compensation schemes in which differentials in relative productivity result in relatively small wage differentials (Bishop 1987a).

Job Knowledge Tests:

From the point of view of learning incentives, the disadvantage of job knowledge tests is that they do not generate incentives to study math, science, history and literature and may induce students to over-specialize in school. If at some point in their career a job in the field for which they prepared is not available, they are left high and dry.

From the point of view of sorting efficiency, job knowledge tests have much to recommend them for they maximize differential validity. They are particularly appropriate if applicants vary in their knowledge and background in the occupation and training costs are substantial. If new hires are likely to be quickly promoted into higher level jobs, the

job knowledge test should also cover the skills required in these jobs. Job knowledge tests are less useful when none of the applicants has experience in the field and training costs are low.

IQ Tests:

Students, parents and teachers view IQ tests as measuring something that schools do not teach. Even though this public perception is not entirely correct, the perception is not likely to change in the near future, so hiring on the basis of IQ tests fails requirement # 1. Students will not see the connection between how hard they study and higher IQ scores.

General Aptitude Test Battery (GATB):

The cognitive subtests of the current GATB measure only a limited number of very basic skills--vocabulary, reading, arithmetic computation and reasoning. There are no sub-tests measuring achievement in most of the subjects in the standard high school curriculum--science, social science, algebra, high school geometry or trigonometry. Greater use of the GATB to make hiring selections would strengthen incentives to learn arithmetic and English but would not strengthen incentives to study other high school subjects. Consequently, hiring on the basis of the GATB fails requirement # 1.

On the other hand, a large body of research suggests that the cognitive subtests of the GATB are valid predictors of job performance in many private sector jobs (Hunter 1983). This research implies that it is in the private interest of individual companies to use these tests for selection. The social benefit of greater test use depends on whether the abilities measured by the tests have larger impacts on worker productivity in dollars in some occupations than in others and whether greater test use would improve the allocation of workers across occupations and jobs. Since the cognitive competencies measured by the GATB do have significantly larger payoffs in plant operator, technical and craft jobs than in operative, service and sales clerk jobs (Hunter 1983; Hunter, Schmidt and Judiesch 1988; Bishop 1988a), reassigning workers who do well on a test to occupations where the payoff to the talent is particularly high will increase aggregate output. Bishop (1988a) has estimated the magnitude of the output effect by reweighting the 31,399 individuals in the GATB revalidation data to be representative of the 71 million workers in the non-professional and non-managerial occupations and then simulating a resorting of workers. Reassigning workers on the basis of occupational work experience and three GATB

composites--basic mathematical and verbal skills, perceptual speed and psychomotor ability--raises total output by 6.9 percent of labor compensation, all but eliminates gender segregation in the work place and substantially improves the wage levels of jobs held by women but has adverse impacts on blacks and Hispanics. As discussed in the paper, the simulation probably overstates the effect of greater test use so the true effect is more likely to be about 2 or 3 percent of compensation or between $60 and $90 billion per year. Thus, the sorting benefits of greater use of the GATB in selection decisions are quite substantial. We will see shortly, however, that other selection methods--broad spectrum achievement tests and achievement exams assessing the student's mastery of the high school curriculum--are able to achieve at least as efficient sorting outcomes as the GATB and generate much better incentive effects.

Broad Spectrum Achievement Tests:

From the point of view of incentives to study a broad range of academic subjects, broad spectrum achievement tests such as the ASVAB are the best of the alternatives reviewed so far. If some of the subtests in the battery include material covered in the standard college prep high school curriculum such as algebra, statistics, chemistry, physics and computers, the use of such tests for selection would generate parental pressure for an upgraded curriculum and encourage high school students to take more rigorous courses. When many employers use achievement tests to select new employees, everyone who wants a good job faces a strong incentive to study, and those not planning to go to college will find the incentive especially strong. The best paying firms will find they can set higher test score cutoffs than low paying firms, so the reward for learning will become continuous. Whether one begins 9th grade way behind or way ahead, there will be a benefit on the margin to studying hard for it will improve one's job prospects.

Broad spectrum achievement tests covering science, computers, mechanical principles, economics, business practices and technology as well as mathematics, reading and vocabulary also maximize sorting benefits as well. Test batteries which cover the full spectrum of knowledge and skills taught in high school are more valid predictors of job performance than tests which assess math and verbal skills only. Evidence for this statement comes from examining the relative contributions of various subtests to the total validity of the ASVAB battery. Maier and Grafton's (1981) analysis of the job

performance SQTs of Marine Corps recruits found, for example, that validity (corrected for restriction of range) was .46 for auto shop information, .50 for mechanical comprehension, .51 for electronics information, .51 for general science, .50 for word knowledge, .52 for mathematics knowledge, and .51 for arithmetic reasoning. Tests measuring electronics, mechanical, automotive and shop knowledge--material that is generally studied only in vocational courses--have high validity. Analyzing this and other military data sets, Hunter, Crosson and Friedman (1985) concluded that the "general cognitive ability" construct that best predicted performance in all military jobs included subtests in general science, electronics information, mechanical comprehension and mathematics knowledge as well as conventional word knowledge and arithmetic reasoning subtests. The addition of these four subtests to the construct increased validity by 11 percent and the proportion of true job performance variance explained in the Maier and Grafton data from .306 to .372 (Hunter, Crosson and Friedman, 1985, Table 19).

Broad spectrum achievement test batteries also improve differential validity. The technical subtests of ASVAB are important predictors of SQTs in technical and maintenance jobs but did not contribute to the prediction of performance in clerical jobs. Verbal subtests contributed to clerical performance but did not correlate with performance in many of the other jobs in the study. Tests measuring understanding of statistics, business, economics, marketing and psychology would probably similarly improve the validity of batteries used to select workers for most white collar jobs in the private sector. The conclusion that follows from this analysis is that, on both sorting and incentive grounds, broad spectrum achievement test batteries are preferable devices for selecting workers than the cognitive subtests of the GATB.

Performance on Achievement Exams Taken at the End of Secondary School

In Canada, Australia, Japan and most European countries, the educational system administers achievement test batteries (eg. the 'O' and 'A' Levels in the UK, the Baccalaureate in France) which are closely tied to the curriculum. These are not minimum competency exams. Excellence is recognized as well as competence. In France, for example, students who pass the Baccalaureate may receive a "Trés Bien", a "Bien", an "Assez Bien" or just a plain pass. Most job applications request information on which exams were taken and what scores were obtained on each exam. These exams generate

credentials which signal academic achievement to all employers and not just the employers who choose to give employment tests. The connection between one's effort in school and performance on these exams is clearly visible to all. Consequently, school sponsored achievement exams like those used in Europe would have much stronger incentive effects than employer administered broad spectrum achievement tests.

This approach to signaling academic achievement has a number of advantages. Because it is centralized and students take the exam only once, job applicants do not have to take a different exam at each firm they apply to and the quality and comprehensiveness of the test can be much greater. There is no need for multiple versions of the same test and it is much easier to keep the test secure. By retaining control of exam content, educators and the public influence the kinds of academic achievement that are rewarded by the labor market. Societal decisions regarding the curriculum (eg. all students should read Shakespeare's plays and understand the Constitution) tend to be reinforced by employer hiring decisions. Tests developed solely for employee selection purposes would probably place less emphasis on Shakespeare and the Constitution.

The disadvantages of schools administering the achievement exams is that students have fewer chances to demonstrate their competence. If one has an off day, one must typically wait many months before the exam can be retaken. With employer administered exams, having an off day is less damaging for one will shortly have a chance to do better at another employer. Employers may also find it is easier to compare job applicants who have all taken the same employer administered exam.

With regard to validity, there is probably little to choose between the two systems. Separate scores are reported for each subject so employers may focus on the tests which have special relevance to their jobs. School administered tests are more reliable measures of achievement because they sample a much larger portion of the student's knowledge of the field (the ASVAB General Science subtest, by contrast, allows the student 11 minutes to do 24 items). They may also be more valid because they are not limited to the multiple choice format. Thus, even though the topics covered in the school exam are probably less relevant to the firm's jobs, the school exam is probably just as valid a predictor of job performance as a specially designed employment test.

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IV. POLICY RECOMMENDATIONS

The key to motivation is recognizing and rewarding learning effort and achievement. Individual learning goals should be established which challenge the student to the maximum extent possible and achievement of these goals should be recognized at a school awards ceremony and communicated to the labor market. If employers know who has learned, they will provide the rewards. There must be significant rewards for learning and real consequences for failing to learn. Learning accomplishments need to be described on an absolute scale so that improvements in the quality and rigor of the teaching and greater effort by all students makes everybody better off.

Some might respond to this strategy for achieving excellence by stating a preference for intrinsic over extrinsic motivation of learning. This, however, is a false dichotomy. Nowhere else in our society do we expect people to devote thousands of hours to a difficult task while receiving only intrinsic rewards. Public recognition of achievement and the symbolic and material rewards received by achievers are important generators of intrinsic motivation. They are, in fact, one of the central ways a culture symbolically transmits and promotes its values. The policy recommendations have been grouped into four categories: school sponsored signals of academic achievement made available to employers, reforming college admissions criteria, greater use of more valid broad based achievement tests for selecting workers and more powerful school administered incentives for academic achievement.

4.1 Improving Measures of Academic Achievement so the Labor Market will Reward Effort in High School

The first best solution to the incentives problem is for the educational system to take on the job of deciding what academic and vocational competencies are to be measured and how they are to be signaled to employers. Schools should provide graduates with certificates or diplomas that certify the students' knowledge and competencies, not just their attendance. Competencies should be defined relative to an absolute standard in the way Scout merit badges are. Different types of competency need to be distinguished and different levels of competency signaled.

Instituting Statewide Achievement Examinations

States should adopt statewide tests of competency and knowledge that are specific to the curriculum being taught (e.g. New York State's Regents Examinations) and then give students a competency profile certifying performance on each of these exams which could be used as an aid in searching for jobs. State merit based scholarships should be awarded on the basis of student performance on these achievement exams. Such examinations would offer several benefits.

- Better inform students and parents about how well the student is doing and thus help parents work with teachers to improve their children's performance.
- Make the relationship between teachers and students more cooperative, with the teacher and students working jointly to prepare the students for the exam.
- Strengthen student incentives to learn because merit based scholarships are based on them and because competence in specific subjects would be effectively signaled to parents, employers and colleges.
- Create a database that school boards and parents could use to evaluate the quality of education being provided by their local school.
- Enable employers to use scores on these examinations to help improve their selection of new employees. If the uncertainties involved in hiring are reduced, expanding employment will become more profitable, total employment will increase, and recent high school graduates will be better able to compete with more experienced workers.

Local Competency Profiles

Another way to motivate students is to give them feedback on their accomplishments through the mechanism of a criterion referenced competency profile. Competency profiles are check lists of competencies that are the goals of instruction. The ratings of competence that appear on a competency profile are relative to an absolute standard, not relative to their classmates. By evaluating students against an absolute standard, the competency profile avoids a negative feedback of one students effort into another student's grade. It encourages students to share their knowledge and teach each other.

A second advantage of the competency profile approach to evaluation is that students can see their progress as new skills are learned and checked off. The skills not

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yet checked off are the learning goals for the future. Seeing such a check list get filled up is inherently reinforcing.

With a competency profile system, goals can be tailored to the student's interests and capabilities, and progress toward these goals can be monitored and rewarded. Vocational educators have found that competency profiles greatly enhance the effectiveness of competency based vocational education. The approach is just as applicable to academic courses as it is to vocational courses. Upon graduation, the competency profile would be encased in plastic, given to the student, and serve as a credential certifying both generic and occupational competencies.

Graduation Credentials ("Career Passport", "Competency Profile") which Signal the Student's Accomplishments in High School.

The coverage and format of the document should probably be worked out cooperatively by a committee that includes school administrators, employers and other interested parties. Developing and using such a document might be a part of a campaign to enlist commitments from major local employers to hire students as interns (during the summer) and new graduates. Compactness and standardization is desireable in order to make it easier for employers to use information in their hiring decisions. Employers should be encouraged to ask to see the portfolio and make a copy of it to attach to the application.

Releasing Student Records

The school can help students provide employers with information by developing an equitable and efficient policy for releasing student records. While developing this policy, school officials should keep in mind their dual responsibilities of protecting the student's right to privacy and helping students find a good, suitable job. The student and his or her parents should receive copies (encased in plastic) of transcripts and other records that might be released so that they may make them available to anyone they choose.

Schools can develop a form that would explain to parents and students their rights, as well as the pros and cons of disclosing information. The Buckley Amendment requires that the form specify the purpose of disclosure, which records are to be released, and who is to receive the records. The law allows the student to specify a "class of parties." The class specified could be "all potential employers contacted by the student," which would

cut down on the paper work needed. Once the student has filed a request, the school is required by law to comply. Schools can best serve students by handling all inquiries expeditiously and without charge.

4.2 Reform College Admission Policies

Promote Advanced Placement Courses

The Advanced Placement program is a cooperative educational endeavor which offers course descriptions, examinations and sets of curricular materials in 28 different academic subjects. Students who take these courses and pass the examinations may receive college credit for high school work. Expanding and upgrading the AP program should be a center piece of any effort to promote excellence in American secondary education. It clearly meets a felt need for it is growing rapidly. The numbers of students taking AP exams more than doubled between 1983 and 1988. Nevertheless, only 8022 of the 22,902 US high schools participate in the Advanced Placement Program and only 52 AP exams are taken on average in each participating high school. In 1988 only 6.6 percent of the seniors and 3.3 percent of the juniors took an AP exam (The College Board 1988). The nation should set a goal of doubling these percentages by 1991 and quadrupling them by 1995. Acting in concert, the college presidents of the 200 most selective colleges in the nation should send a letter to the every high school principal in the country (with copy to the school board and local newspaper) urging them to create an AP program or expand the one they have. They should also announce that starting in 1993, students seeking admission to their school should have taken and passed at least one AP course in junior year and be taking more than one AP course their senior year.[6] Students coming with AP credit should be placed in more advanced courses and as soon as possible these more advanced courses should become the normal starting point for college freshman who intend to concentrate in the field.

The federal government can facilitate the growth of the AP program by financing summer institutes for the teachers of AP courses and by offering a $100. AP Excellence Award (larger if the student is eligible for Pell Grant aid) to every student who gets an "eligible for college credit" score on the exam and $150. award for getting a top score.

To insure that attending a summer institute is considered a plum, compensation should be generous. In 1988 approximately 42,000 teachers taught AP courses. Rapid expansion of the program will require a yearly increase of 8000 in the stock of teachers teaching AP courses and if half of the increment to the stock were to experience summer institute training for 6 weeks, the cost would be about 28 million dollars. In 1988 286,009 students would have been eligible for an AP excellence award so the program would have cost under 40 million dollars. The purpose of the AP Excellence Award is to honor excellence and encourage students to take AP courses and only secondarily to aid in the finance of higher education. If a good deal of publicity were attached to these awards, they would have major symbolic effects.

Induce Colleges to Drop the SAT and ACT Tests from their selection criteria and substitute scores on AP and Regents type exams which cover the curriculum taught in High School

While national tests are necessary, the Scholastic Aptitude Test (SAT) is not the kind of test that is helpful. The SAT suffers from two very serious limitations: the limited range of the achievements that are evaluated and its multiple choice format. The test was designed to be curriculum free. To the extent that it evaluates the students' understanding of material taught in schools, the material it covers is vocabulary and elementary and junior high mathematics. Most of the college preparatory subjects studied in high school--science, social studies, technology, art, music, computers, trigonometry and statistics--are completely absent from the test. As a result, it fails to generate incentives to take the more demanding courses or to study hard. The multiple choice format is also a severe limitation. National and provincial exams in Europe are predominantly essay and extended answer examinations. The absence of essays on the SAT and ACT tests contribute to the poor writing skills of American students. The test advertises itself as an ability test but is in fact an achievement test measuring a very limited range of achievements (Jencks and Crouse 1982). Jencks and Crouse have recommended that either the SAT evaluate a much broader range of achievements or be dropped in favor of AP examinations. Knowledge and understanding of literature, history, technology and science and higher order thinking skills should all be assessed. These exams should not be limited to a multiple choice format and essays should be required where appropriate. Foreign language exams, for example, should test conversational skills as well as reading and

writing. Students taking science courses should be expected to conduct experiments and demonstrate the use of lab equipment.

Promote the Development of New Assessment Mechanisms

Linking assessment to the curriculum requires a greater diversity of assessment mechanisms. States should not be prevented from having their own unique curriculum simply because examinations keyed to this curriculum are not available. However, the need for multiple versions and for fairness to minorities make test development very expensive. The federal government should underwrite state consortia and other organizations that seek to develop alternatives to currently available tests and assessment mechanisms. Priority needs to go to developing methods of assessing higher order thinking skills and competencies that cannot be evaluated using a multiple choice format.

While testing organizations would publish and oversee grading of the exams, the subjects covered by the exam and the skills tested would be selected by a committee of teachers and specialists in the field. Examples of groups that might sponsor and direct test development are the National Council of Teachers of Mathematics, associations of private colleges, state boards of education, and textbook publishers. There should be a conscious effort to maximize philosophical and educational diversity in the selection of consortia for funding. The push for better measures of student learning should not be limited to the academic arena. A similar effort should be made in the vocational area. Consideration should be given to federal subsidies of the administration cost of more costly assessment mechanisms such as essays, judged portfolios, hands-on performance tests and simulations designed to measure higher order thinking skills.

4.3 Greater Use of Improved Employment Tests

If states do not adopt a credentialing system based on statewide achievement testing, employer testing must be allowed so that the labor market will reward effort and learning in high school.

Add Subtests Measuring Technical, Scientific and Advanced Mathematical Competency to the General Aptitude Test Battery

The Employment Service's program of validity research for the GATB has made this test one of the few employment tests whose validity (as a predictor of job performance) has been generalized for a great variety of jobs. The content of the GATB was set in the 1940's and there has been little change in the content of the academic subtests since then. The nature of jobs has changed substantially and it is time to rethink the content of the GATB. The ASVAB research discussed earlier indicates that validity would be substantially increased by adding subtests measuring technical, scientific and advanced mathematical knowledge and skills. The Department of Labor should immediately add subtests similar to the technical, mathematical knowledge and science subtests of the ASVAB to the GATB and include these subtests in the composites that are used for recommending clients to civilian jobs that are similar to the jobs studied in the military. The employment service should also undertake a major study of the validity of the new GATB in the full spectrum of civilian jobs.

The fear of litigation has significantly inhibited testing research outside of government. Companies no longer share the results of their validity studies or allow them to be published (even when the company's name is withheld) for fear of revealing their defense strategy to a potential litigant. As a result, research on tests other than the GATB has been inhibited. The government needs to step into the vacuum it has created and sponsor a major increase in research into the development and validation of improved employment tests.

EEOC Regulations Should Encourage the Use of Broad Spectrum Achievement Test Batteries rather than IQ Tests and the Current GATB

EEOC regulations and case law have in the past required that a very expensive validation study be conducted before a firm can use any test to help select employees (Friedman and Williams 1982). The result has been to greatly diminish the use of tests for employee selection and to substantially reduce the rewards for learning. Sandra Day O'Conner's concurring opinion in the Watson case appears to open the door for increased use of employment tests (McDowell and Dodge 1988). It appears that employers will be able to justify the use of employment tests without having to undertake costly validity

studies in their own firm by citing validity research done for similar jobs in other firms. Since civilian research on test validity has used the GATB almost exclusively, there is a very real danger that most firms will choose to use reading, vocabulary, and arithmetic reasoning tests that are demonstrably similar to their GATB counterparts. Unfortunately, the verbal and mathematical subtests of the GATB are considerably less valid than tests measuring a broader range of competencies and do not generate incentives for students to study history, algebra, trigonometry, and science.

Courts have in the past required that employers demonstrate that each question on an employment test has a specific application in each job for which it is a proposed selection device. To avoid having to redesign tests for each job, test developers are likely to dumb the test down and include only simple questions covering mathematical, scientific and technical principles that are learned in grade school. Litigation costs and the potential liability are enormous so companies have become extremely cautious about testing. When selecting a test, defensibility in court has become a much more important criterion than maximum validity. Given the uncertainty of whether ASVAB research will be accepted as evidence on the validity of similar tests for civilian jobs, broad spectrum achievement test batteries will probably be judged too risky. A well designed validity study can protect a firm using an unconventional test battery but in most cases the potential benefit of finding a more valid selection method will not outweigh the costs of the study and the greater risks of litigation. If things are left as they are, it will be at minimum a decade before tests measuring competence in algebra, science and the technical arena can be used as general selection devices for craft and other blue collar jobs. Firms need to be given a signal by the EEOC that broad spectrum achievement tests are acceptable selection devices and in fact preferred over the low level basic skills test that serves as the 'g' aptitude of the GATB.

For employment tests to generate incentives to learn, students, parents and teachers must be aware that local employers are using tests for selection and what kind of material is included on these tests. Unfortunately, the fear of litigation has caused many employers to give only limited publicity to their use of tests. This is another reason why employers need to be told by people in authority that they are acting in the national interest when they seek out and reward those who have high level academic skills.

The Federal Government Should give Greater Weight to Academic Achievement in its own Hiring

The federal government is the largest employer in the country. It should set an example for the private sector by announcing that hence forth it is giving greater weight to academic achievement in high school and college than it has in the past.

The military currently admits recruits into the military on the basis of AFQT scores and the high school diploma. The current AFQT is an average of scores on the verbal, arithmetic reasoning and mathematical knowledge subtests of the ASVAB. By adding the general science, electronics knowledge, mechanical comprehension and the auto/shop knowledge tests to the composite which defines the AFQT, the military would simultaneously increase the validity of their selection and improve incentives to study science and technical subjects in high school.

The Office of Personnel Management is designing a biodata form to be used for selecting professional and managerial personnel for the federal government. The current draft of the form asks applicants a number of questions about the grades in high school and college and about class rank. It does not ask about the difficulty level of the courses taken (Office of Personnel Management, 1987). Current plans are to request that transcripts be sent only for a sample of the applicants and to use this data only for checking the accuracy of the information provided. If discrepancys are discovered for people who were hired, the cases will be referred to investigators. The questions are worded in such a way, however, that only the most outrageous of distortions can be proved to be a lie and therefore are grounds for dismissal. The following changes in civil service hiring procedures are recommended:

- All candidates for civil service jobs (including clerical jobs) should be required to send their high school and college transcripts.
- After a preliminary screening on the basis of the biodata key, course grades and difficulty level indicators should be coded for the most recent school attended.
- Final rankings should be based on a combination of the transcript information, biodata scores on job relevant tests and other relevant information.

This change will increase hiring costs but the benefits of greater validity and improved incentives outweigh these costs by a large margin.

4.1 School Based Rewards for Learning

Cooperative Learning

One effective way of inducing peers to value learning and support effort in school is to reward the group for the individual learning of its members. This is the approach taken in cooperative learning. Research results (Slavin 1985) suggest that the two key ingredients for successful cooperative learning are as follows:

- A cooperative incentive structure--awards based on group performance--seems to be essential for students working in groups to learn better.
- A system of individual accountability in which everyone's maximum effort must be essential to the group's success and the effort and performance of each group member must be clearly visible to his or her group mates.

For example, students might be grouped into evenly matched teams of 4 or 5 members that are heterogeneous in ability. After the teacher presents new material, the team works together on work sheets to prepare each other for periodic quizzes. The team's score is an average of the scores of team members, and high team scores are recognized in a class newsletter or through group certificates of achievement.

What seems to happen in cooperative learning is that the team develops an identity of its own, and group norms arise that are different from the norms that hold sway in the student's other classes. The group's identity arises from the extensive personal interaction among group members in the context of working toward a shared goal. Since the group is small and the interaction intense, the effort and success of each team member is known to other teammates. Such knowledge allows the group to reward each team member for his or her contribution to the team goal, and this is what seems to happen.

Turn Schools into All Day Learning Centers

Schools should remain open after the end of the regular school day and a full range of remedial and enrichment programs and extra curricular activities and interscholastic sports should be offered.

Keep the Schools Open During the Summer

Longitudinal studies of learning have found that the pace of learning slows considerably during the summer and that disadvantaged students especially lose ground

during the summer months (Heyns 1987). Experimental evaluations of STEP, a program for disadvantaged youth that combines a part time summer job with about 90 hours of remediation, has found that adding the remediation to the summer job results in gains in academic achievement of .5 grade level equivalents (Corporation for Public Private Ventures 1988). It would appear that summer programs targeted on educationally and economically disadvantaged children are likely to have high payoffs.

A Massive Dose of Mastery Learning

Students who are not learning at the desired rate should be required to commit additional time to the task after school and during the summer. At the beginning of the school year school personnel would meet with the student and his or her parents to set goals. Students who are not performing at grade level in core subjects and who do not make normal progress during the school year should be kept after school for tutoring and remedial instruction and required to attend summer school. Assessments of progress should be made at appropriate points during the school year to inform students of their progress and to enable those who are participating in remedial programs after school to demonstrate they are now progressing satisfactorily. Course grades and teacher evaluations would be a central part of the assessment process, but there should be an external yardstick as well. The external yardstick might be a competency check list, a mastery test keyed to the textbook, or an exam specified by the state, the school or collectively by the teachers in the that grade level or department. The reason for the external yardstick is that it helps insure that students perceive the standard to be absolute rather than relative to others in the class, and it helps create a communality of interest between teacher and student. Teachers need to be perceived as helping the student achieve the student's goals not as judges meting out punishment. Since students will want to avoid being required to get remedial instruction after school and during the summer, this will be a powerful incentive for them to devote themselves to their studies.

Honoring Academic Achievement

Schools should strengthen their awards and honors system for academic and non-academic accomplishments. The medals, trophies, and school letters awarded in interscholastic athletics are a powerful motivator of achievement on the playing field. Academic pursuits need a similar system of reinforcement. Public school systems in Tulsa

and a number of other cities have started awarding school letters for academic achievements. Awards and honors systems should be designed so that almost every student can receive at least one award or honor before graduation if he or she makes the effort. Outstanding academic performance (e.g., high grades or high test scores) would not have to be the only way of defining excellence. Awards could be given for significant improvements in academic performance since the previous year or since the beginning of the school year, for public service in or out of school, for perfect attendance records, and for student of the week (criteria could vary weekly). The standard for making an award should be criterion referenced: if greater numbers achieve the standard of excellence, more awards should be given.

A prominent place in the school should be reserved for bulletin boards where pictures of the most recent winners and reasons for their receiving recognition could be posted. Another form of recognition could be displays of student work: art, science, social studies, vocational education projects, and so forth. Periodically, the parents of the most recent award winners and sponsoring teachers should be invited to an evening assembly at which time the principal would award the students the certificate or plaque recognizing their accomplishments.

4.5 Summary

The key to motivation is recognizing and rewarding learning effort and achievement. Employers should start demanding high school transcripts and give academic achievement (particularly achievement in math and science) much greater weight when hiring. Business and industry should communicate this policy to schools, parents, and students. High school graduates should not be relegated to sales clerk jobs simply because of their age. Like their peers in Europe, Canada, and Japan, they should be allowed to compete for really attractive jobs on the basis of the knowledge and skills they have gained in high school.

Schools should reduce the disincentives to studying. Cooperative learning such as Student Teams-Achievement Divisions would encourage the peer group to reward learning effort by having students study in small heterogeneous groups and structuring competition to be between evenly matched teams and rather than unevenly matched individuals (Slavin, 1983). Criterion referenced competency profiles should be available for students,

describing and certifying academic, vocational, artistic and extra-curricular accomplishments. Frequent awards ceremonies should recognize individual effort to attain learning goals, so that every student who works hard is recognized sometime in the school year. Those seeking work will be able to use their grades as well as competency profiles and awards as aids in securing employment.

Although the problems are less dramatic for the college-bound, parallel efforts should be made to increase incentives for them. College counselors and admission officers should deemphasize SATs, rank in class and GPA and substitute criterion-referenced systems of assessment such as AP exams in which the student is not engaged in zero sum competition with classmates. Although paper and pencil achievement tests tied to the state's curriculum should be part of this assessment, the measures of achievement available must be broadened to include accomplishments such as essay writing , conversing in a foreign language, conducting laboratory experiments, playing an instrument, repairing a car, and so forth.

Institutional arrangements of schools and the labor market have profound effects on the incentives faced by students, teachers, parents and school administrators. The passivity and inattention of students, the low morale of teachers, the defeat of so many school levys and low rankings on international measures of achievement are all logical outcomes of institutional arrangements which weaken student incentives to study and parental incentives to fund a high quality education. Only with an effective system of rewards within schools and in the labor market can we hope to overcome the pervasive apathy and achieve excellence.

NOTES

1. At the post secondary level, university reputations are based on the rigor of the program and students compete for the right to pay $15,000 a year to attend and study for long hours. Competition is keen for admission to selective universities because a degree from one of these colleges is handsomely rewarded by the labor market (Solomon 1975; Wise 1978). Comparably rigorous private secondary schools have a much smaller share of their market. The reason for their small market share is that they provide only modest help in the competition for admission to the best colleges. The early curriculum specific college admissions tests were abolished in favor of aptitude tests partly to reduce the advantage that students at private high schools had under the old system. Attending such schools probably has little effect on SAT scores and almost certainly results in a lower GPA.

2. The survey was of a stratified random sample of the NFIB membership. Larger firms had a significantly higher probability of being selected for the study. The response rate to the mail survey was 20 percent and the number of usable responses was 2014.

3. These tests measure the competencies that are the prime objectives of schooling. School attendance has been shown to improve performance on these tests (Lorge, 1945). Between World War I and World War II, the average IQ test scores of literate white army draftees increased by 11 points (Bishop 1989).

4. Studies that measure output for different workers in the same job at the same firm, using physical output as a criterion, have found that the standard deviation of output varies with job complexity and averages about .164 in routine clerical jobs and .278 in clerical jobs with decision making responsibilities (Hunter, Schmidt & Judiesch 1988). Because there are fixed costs to employing an individual (facilities, equipment, light, heat and overhead functions such as hiring and payrolling), the coefficient of variation of marginal products of individuals is assumed to be 1.5 times the coefficient of variation of productivity. Because about 2/3rds of clerical jobs can be classified as routine, the coefficient of variation of marginal productivity for clerical jobs is 30 % [1.5*(.33*.278+.67*.164)]. A .5 validity for general mental ability then implies that an academic achievement differential between two individuals of one standard deviation (in a distribution of high school graduates) is associated with a productivity differential in the job of about 11 % (.5*.74*30%). The ratio of the high school graduate test score standard deviation to the population standard deviation is assumed to be .74. This issue is more thoroughly discussed in Bishop (1987b).

5. Most of the published studies of the validity of grades probably used information that had been collected by the firm when hiring decisions were being made. Consequently, most of the validity coefficients reported for grades are probably negatively biased by the selection effects so the true validity of GPA than is generally thought.

6. This proposal sounds radical but, in fact, is only a modest change from current practice at these selective colleges. A survey of college placement officials conducted by USA Today and interviews of officials at Cornell and SUNY Binghamton conducted for this report found that students were expected to take AP courses if they are offered and grade point averages were adjusted for the difficulty level of the courses taken. High school students and parents are generally unaware of this policy, however, and many have not factored it into their high school course selections. The announcement, therefore, has two effects: it informs students and parents of existing admissions policies and warns that come 1993 those seeking admission to selective colleges will not necessarily be held harmless if a local high school does not offer AP courses. This announcement will generate strong political pressure on principals and school boards to expand their AP program and allow additional students to take AP courses. Students at schools not offering AP might be offered other ways of demonstrating college level proficiency such as an AP independent study option, taking courses during the summer at a local college or high scores on the afternoon subject matter SAT exams or New York State Regents exams. Exceptions would have to be made for students from under represented minorities, foreign students and in other individual cases but exceptions should not become the rule.

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